LIVING LAKE, CHANGING CATCHMENT: 2011 Summary of main themes

Professor Bryan Jenkins

Waterways Centre for Freshwater Management

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH·NEW ZEALAND
New Zealand's specialist land-based university

Waterways
Centre for Freshwater Management

UC
UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

ENCOURAGING PROGRESS

Shift from:

- “Comparison of the past” to “predictions of the future”
- “Looking for actions” to “restoration activities”
- “Focus on the lake” to “focus on the catchment”

Retention of:

- Collaborative approach with community, tangata whenua, government and industry involvement

INCREDIBLE CHALLENGES

- Multiple lake management issues:

  nutrients, clarity, salinity, habitat, vegetation, lake openings
- Multiple strategic objectives:

  economic, environmental, social, cultural
- Rate of land use change in catchment:

  urban expansion (4%pa), irrigation expansion (100% increase)
- Statutory framework for water quality improvement (NPS, RPS, ZIP)
- Natural variability and man-induced impact

MULTIPLE TIME SCALES

- Tidal cycle variations (inflow/outflow)
- Daily variations (DO: 5 to 20 mg/L)
- Annual variations (fish migrations)
- Decadal changes (g/w levels, natural & man-made)
- Hundreds of years (cores: increasing salinity)

MULTIPLE SPATIAL SCALES

- Lake
- Margins of the lake
- Tributaries of the lake
- Lake/Coast interaction
- Selwyn catchment
- Beyond the catchment (groundwater, Lake Coleridge)

RESILIENCE

- Long fin eel decline
- Fish presence and flow permanence
- TLI drop and return
- Algal blooms
- Lakes resilient to a point then abrupt change: increased effort required for environmental improvement

MEASUREMENT FOR MANAGEMENT

- Lake inputs/outputs
- Fish/flow relationships
- Lysimeters
- Cost effectiveness of replanting
- Farm impacts
- Linkages (TLI – summer lake level)
- Everything!!

MODELLING FOR FUTURE PREDICTIONS

- Lake water balance for WCO scenarios
- Openings and fish/eel numbers
- Water takes and river flows
- Species richness and flow reductions
- Lake modelling of nutrient and climate change

Note: linear regressions but non-linear processes

LAND USE MANAGEMENT

- Diffuse source pollution is a combination of land use (TA) and water use (RC)
- Encouraging to see TA urban stormwater management
- Encouraging to see riparian planting
- Need for land use management on a catchment basis
- Need for rural stormwater management

FONTERRA AND OTHER LAND USERS

- Recognition of Fonterra commitments
- Wish to see an environmental contribution analysis that matched their economic contribution analysis
- Wish to see environmental quality control that matched their food quality control
- Not just effluent and fertiliser management, urine patches is a big issue
- Need all land-based industries to adopt environmental improvements and quality control

CHANGES IN STATUTORY FRAMEWORK

- Statutory backing of CWMS
- NPS for freshwater management
- WCO for lake openings
- Land and water quality management (audited self management)
- Water allocation consents (current use is only part of potential use; CPW surface water – groundwater not transferable)
- Zone Implementation Programme

INTEGRATION OF RESEARCH

- ECan/NIWA/consultants
- University research
- Models as integrators
- Scientists/Planners/Communities
- Lake research centre

NEW THINKING / NEW SOLUTIONS

- Storage by managed aquifer recharge
- Improved farm management
- Lake treatments
- Tailor made openings
- Constructed wetlands
- “Whole new game” not “Business as usual”